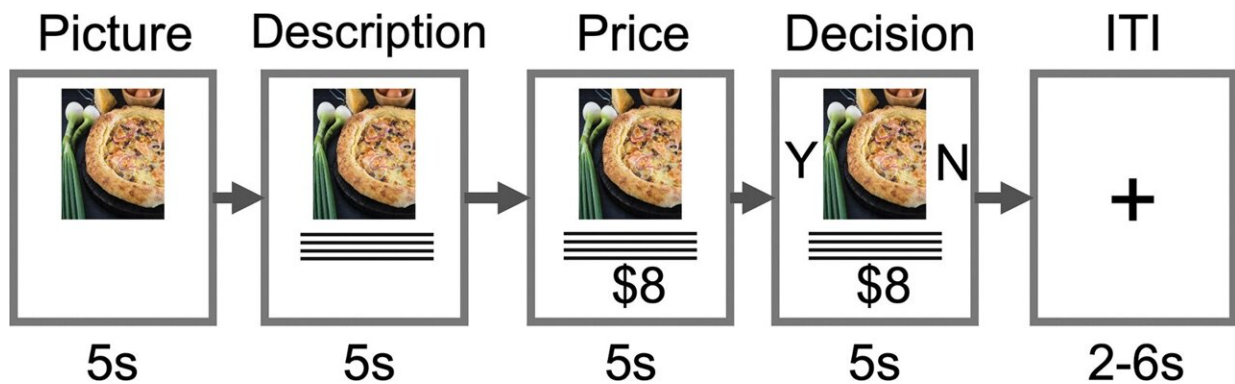


Study shows brain activity helps predict restaurant sales

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Participants observed an image of a dish (5 s), the name of the dish, and a short description of the dish (5 s). At the end of the trial, participants indicated their choice (5 s), followed by a variable fixation interval (2 s-6 s). Credit: HSE University

It has been [recognized](#) that the activity of dopamine centers in the brain can predict the popularity of songs, the efficacy of advertising campaigns, and the success of microcredit programs. But can we accurately forecast next year's sales of restaurant dishes based solely on the neural activity of individuals as they view photos from a new restaurant menu?

In a [collaborative effort](#), researchers of the HSE Institute for Cognitive Neuroscience and the Graduate School of Business teamed up with the

Chaihona No. 1 [restaurant](#) chain, encompassing approximately 50 establishments, to carry out a study using [functional magnetic resonance](#) imaging (fMRI) to predict the preferences of restaurant patrons. The research is published in the journal *PLOS ONE*.

"This is the first-ever attempt to forecast restaurant sales and the food preferences of large groups by analyzing brain activity. Our findings confirm those from prior studies indicating that activity within the brain's reward system in a relatively small subset of individuals can predict the collective choices likely to be made by a larger independent group," says Andrew Kislov, one of the study authors and postgraduate student of the HSE School of Psychology.

The 22 participants were instructed to refrain from eating for three hours before the study. During the fMRI session, each participant was presented with a series of color photographs featuring 78 dishes with corresponding names and prices. The participants were asked to either accept or reject each dish, with the understanding that they would later be offered one of their chosen dishes to enjoy for free. Meanwhile, the researchers examined the activity in the subjects' nucleus accumbens, the so called 'pleasure center' situated deep within the brain and rich in dopamine.

After a certain period following the experiment, the researchers were able to compare the neural activity data with the actual sales at the restaurant chain. The analysis revealed a statistically significant correlation between peaks of neuronal activity in the [nucleus accumbens](#) and the sales of specific dishes. This means that in the future, restaurants will be able to leverage the insights from a limited preliminary study to design a compelling menu featuring dishes likely to be sought after by guests.

"It is intriguing that neuro-prediction of individuals' behavior in the

market is indeed possible. A surge of dopamine observed in a small group of subjects serves as a strong indicator of how the broader population is likely to behave. Evolution has endowed us with fundamental decision-making mechanisms that operate in a similar fashion across most individuals, thereby allowing us to extrapolate potential future responses of the entire population based on [brain activity](#) observed in a small group," explains Vasily Klucharev, project leader, leading research fellow at the HSE International Laboratory of Social Neurobiology.

More information: Andrew Kislov et al, The prediction of market-level food choices by the neural valuation signal, *PLOS ONE* (2023). [DOI: 10.1371/journal.pone.0286648](https://doi.org/10.1371/journal.pone.0286648)

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